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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/584,434

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10/02/2009

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EXAMINER

GHYKA, ALEXANDER G

ART UNIT

PAPER NUMBER

2812

MAIL DATE

DELIVERY MODE

10/02/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/584,434	Applicant(s) SHELTON ET AL.	
	Examiner ALEXANDER G. GHYKA	Art Unit 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/26/2008; 10/27/2008; 6/22/2006</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-6 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over CN1215503A (as relied on Chinese first Office Action submitted by Applicants) in view (US2002/0093023).

With respect to Claim 1, CN 1215503A discloses a method for fabrication of a flip-chip light emitting diode together with the following technical features: the method includes the following steps, a) forming epitaxial layers on a sapphire substrate 30 to produce an epitaxial wafer; b) fabricating a plurality of light emitting diode devices on

the epitaxial wafer; c) dicing the epitaxial wafer and the sapphire substrate 30 to generate at least one separated device die, for example; the device die 1, said device die 1 including at least one light emitting diode device and a portion of the sapphire substrate 30; d) flip-chip bonding the device die 1 to a mount 2, said flip-chip die 1 connected to the electrodes 7 and 8 (equivalent to the bonding pad in Claim 1) on the mount 2 by p electrode 5 and n electrode 6 of this die, and further fixing the device die 1 to the mount 2. See lines 10-24, page 20; lines 14-23, page 23; line 5, page 24 to line 2, page 26 of the Specification and Figures 9A, 9B, 13 and 15B of CN 1215503A .

CN 1215503A differs from the present Claims in that it does not disclose step e) removing some of the growth substrate from the device die.

US 2002/0093023A1 also discloses a method for fabrication of a flip-chip light emitting diode device together with the following technical features: fixing the die of the light emitting diode to the submount 130 by the solder connections 132 and 136 and removing at least some of the substrate 117 for its benefit of increasing the light emission intensity of the light emitting diode device. See paragraphs 0052, 0060, 0063-0069 of the Specification; and Figs. 4, 7A-7F and 8 of US 2002/0093023 A1.

It would have been obvious for one of ordinary skill in the art to remove at least some of the growth of the substrate in CN 1215503A, for its known benefit in the art of increasing the light emission intensity of the light emitting diode device as disclosed by US 2002/0093023. As both references pertain to flip-chip light emitting diodes, a *prima facie* case of obviousness is established.

With respect to Claim 2, CN 1215503A further discloses as performing step d) , further providing an UV curable insulating resin 16 (equivalent to the support material in Claim 2) interposed between the mount 2 and the device die 1. See page 24, line 5 to page 26, line 2, and Figure 13 of CN 1215503A.

With respect to Claim 3, CN 1215503A further discloses as performing step d) further providing an UV curable insulating resin 16 (equivalent to the support material in a flowable forming Claim 3) interposed between the mount 2 and the device die 1, the insulating resin 16 contacting with the device chip 1 and the mount 2, and irradiated with UV light for curing so as to support the device die 1. See page 24, line 5 to page 26, line 2 and Figure 13.

With respect to Claim 4, the removal of excess underfill material, for its benefit in optimizing the thickness of the underfill layer would be obvious to one of ordinary skill in the art.

With respect to Claim 5, CN 1215503A discloses a UV curable insulating resin, which is not conductive as required by the afore mentioned Claim. See page 24, line 5 to page 26, line 2 and Figure 13.

With respect to Claim 6, US 2002/0093023A1 discloses that the extraction efficiency of the flip chip light emitting device can be optimized by varying the thickness of substrate 117. It would have been obvious for one of ordinary skill in the art, at the time of the invention to remove substantially the entire substrate for its benefit of increasing the light emission intensity of the flip chip device.

With respect to Claim 9, US 2002/0093023A1 discloses removing less than the entire portion of the growth substrate from the device die. See paragraphs 0052, 0060, 0063-0069 of the Specification and Figures 4, 7A-7F and 8.

With respect to Claim 10, US 2002/0093023A1 discloses removing less than the entire portion of the growth substrate from the device die, therefore the thickness of the layer would be inherently thinner. See paragraphs 0052, 0060, 0063-0069 of the Specification and Figures 4, 7A-7F and 8

Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over CN1215503A (as relied on Chinese first Office Action submitted by Applicants) and (US2002/0093023) as applied to claims 1-6 and 9-10 above, and further in view of CN1262528A (as relied on Chinese first Office Action submitted by Applicants).

CN 1215503A and US 2002/0093023 are relied upon as discussed above. The removal of a growth substrate is suggested as discussed above.

However, the references do not disclose illuminating the growth substrate with laser light, in order to remove it.

CN1262528A discloses a method for fabricating light emitting diodes which comprises illuminating the growth substrate 30 included on the die of the light emitting diode with laser light to remove the growth substrate 30. See lines 17-29 of page 4.

It would have been obvious for one of ordinary skill in the art to use a laser in the process of CN 1215503A and US 2002/0093023, for its benefit in removing a growth substrate as disclosed in CN1262528. As all of the references are drawn to light

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emitting diodes, the use of a known technique, laser illumination, for its known benefit, removal of a growth, would have been *prima facie* obvious to one of ordinary skill in the art.

With respect to Claim 8, CN 1215503A discloses a sapphire substrate as disclosed above. See page 23, lines 13-23. Moreover, the selection of type of laser light (ultraviolet laser light), would be a matter of optimization for one of ordinary skill in the art, as laser light is broadly disclosed. Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. See *Allen et al v. Coe* , 57 USPQ 136. Moreover, the discovery of an optimum value of a result effective variable in a known process is within the skill of the art. See *In re Antonie*, 195 USPQ 6 (CCPA 1977). In the present case the selection of the appropriate laser would be obvious, for its known benefit in removing the growth, as a matter of optimization.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXANDER G. GHYKA whose telephone number is (571)272-1669. The examiner can normally be reached on Monday through Friday 9 to 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Garber can be reached on (571) 272-2194. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AGG

September 29, 2009

/Alexander G. Ghyka/

Primary Examiner, Art Unit 2812